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EXAMINER	
STREGE, JOHN B	
ART UNIT	PAPER NUMBER
2625	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/758,325	KIM ET AL.	
	Examiner	Art Unit	
	John B Strege	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 May 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6 and 8-32* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *1-6 and 8-17* is/are allowed.

6)☒ Claim(s) *18-32* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *28 May 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Response to Arguments

1. In response to the Applicant's amendment B filed 5/28/04 all requested changes to the specification and claims have been entered. Claims 7 and 33 have been canceled.

Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 18-22, 25, and 26-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ito USPN 5,406,700 in view of Applicant's admitted prior art.

Ito discloses a method of producing an integrated circuit lead frame and a method of mounting a chip onto the lead frame (col. 1 lines 13-17). Ito further discloses a pair of inner leads 3 and 3m (figure 1) that are made to have Z-shaped step portions (unsymmetrical part of the substrate). As seen in Fig. 2 labeled 20a a lead eye box is set on an unsymmetrical portion, and a corner point is found 21a (lead eye point). The window is "recognized as an image" (col. 4 lines 43-45). This image is "compared with a reference image and reference

position information stored in an image recognition apparatus" (col. 4 lines 45-47).

Ito does not explicitly disclose having two lead eye boxes. However the suggestion is made that in prior art systems on which the invention is based in order to clarify the recognition/ correction position on the inner lead 3, the lead eye boxes can be placed on different parts of the leads as illustrated with 14 and 15 in figures 12 and 13 respectively (col. 1 lines 54-60).

Figure 13 of the Applicant's figures is labeled as prior art and shows that in previous systems it is well known to use two lead eye boxes.

At the time of the invention it would have been obvious to one of ordinary skill in the art to combine Ito and the Applicant's admitted prior art to use two lead eye boxes instead of one. The motivation for doing so would be to add a second point in order to clarify or improve the recognition. Thus it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Ito and the Applicant's admitted prior art to obtain the invention as specified in claim 18.

Regarding claim 19 further discloses "that the first picture is completely identical to the control picture." Ito does not explicitly disclose this since it uses the difference in the images to properly bond the leads in the correct position. It is not an inventive step to have the picture completely identical to the control picture. It is possible that the invention disclosed by Ito could be in the proper position when the image is taken which would mean that no further corrective action is needed to place the lead in the proper bonding position. Since this is

something that could naturally occur it would be an obvious part of the invention of Ito to account for the situation where the photographs are identical.

Regarding claim 20 Ito discloses that the comparison is made in order to compute displacement quantities, and "bonding position correction is performed" to move the leads so that a good result, or proper bonding can be obtained" (col. 4 lines 45-53). This good result would mean making the position identical to the reference.

Regarding claim 21, Ito does not explicitly disclose using a camera, although an image is captured and it is well known in the art to use a camera to capture an image. Ito does not disclose moving the camera to make the picture identical with the control picture.

On page 6 lines 18-35 of the applicant admitted prior art the process of moving a camera to make an image equivalent to a control image if the image is within a specified range is disclosed.

Ito and the applicants admitted prior art are analogous because they are from the same field of endeavor of wire bonding processes of a lead frame.

At the time of the invention it would have been obvious to one of ordinary skill in the art to combine Ito with the applicant's admitted prior art in order to obtain an invention that accounts for camera misalignment by aligning the camera to the window. The motivation for doing so would be to allow for slight problems that result from camera alignment and do not relate to the position of the substrate to be resolved before moving the substrate. Therefore it would have been obvious at the time of the invention to one of ordinary skill in the art to

combine Ito with the applicant's admitted prior art in order to obtain the invention specified in claim 21.

Regarding claim 22, as seen in figure 2 of the disclosure by Ito the lead eye box is set over the lead but also includes part of the gate.

Regarding claim 25, figure 13C and 13B labeled prior art disclose setting the lead eye box and the lead eye point on the support bar.

Claim 26 discloses, "the method as claimed in claim 18 wherein the first lead eye box and the first lead eye point are set on the first unsymmetrical part of the substrate through an observation hole of a clamp." Although Ito discloses setting the lead eye box and lead eye point on an unsymmetrical part of the substrate, it is not explicitly disclosed that this is through an observation hole of a clamp.

The applicant's admitted prior art discloses a clamp 1100 with a window 1140 (figure 11) and discloses that a lead eye box is set inside the window. Furthermore it can be seen in figure 13a that the inner lead are visible through the window.

Ito and the applicant's admitted prior art are analogous art because they are from the same field of endeavor of wire bonding processes of a lead frame.

At the time of the invention it would have been obvious to combine Ito with the admitted prior art of the applicant in order to obtain a device to produce a lead frame according to Ito, that also accounts for the use of a clamp to hold the frame down as is taught by the applicant's admitted prior art. The motivation for doing this would be to allow the invention of Ito to work also with a clamp if

necessary. Therefore it would have been obvious at the time of the invention to one of ordinary skill in the art to combine Ito and the applicant's admitted prior art in order to obtain the invention as specified in claim 26.

Regarding claim 27, the inner lead disclosed by Ito is part of a lead frame (as seen in figure 1).

4. Claims 28-29, and 31-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Moon USPN 5,796,161 in view of Ito USPN 5,406,700 and further in view of Roberts et al. USPN 6,577,019 (hereinafter "Roberts").

Claim 28 discloses, "a method of detecting an orientation of a die comprising: setting a first die eye box and a first die eye point on a specific pattern of the die; capturing a first picture inside of the first die eye box; and comparing the first picture to a control picture stored in a memory."

Moon discloses a method of aligning a lead frame strip in a wire bonding process (col. 1 lines 5-12). Further disclosed are multiple die sensing regions (17 and 18 of figure 5a and 6) that expose corner portions of the die (col. 4 lines 47-49). Here the die eye point could be considered to be the line of view of the camera. The alignment condition of the lead frame strip is sensed (col. 4 lines 41-42) and the sensing means are "picture identifying cameras set on the wire bonding equipment" (col. 4 lines 50-51). A picture is captured and used to confirm the alignment condition of the die (as shown in step 105 of figure 7).

Moon does not explicitly disclose that the eye point is set on the picture adjacent an edge of the die and located outside of the bond pads of the die. Moon does not go into detail on how alignment is confirmed, therefore does not explicitly disclose if comparing the image to a control picture is included in this step.

Comparing an image to a reference image for the purpose of alignment is well known in the art of alignment. Ito discloses taking an image and comparing that image with a reference image (col. 4 lines 45-47). Using this method the positional displacement and bonding and perfom bonding correction obtaining good results (col. 4 lines 37-53).

Roberts discloses using an eyepoint feature 54 that is located adjacent to the edge of the die and outside of the bond pads. Roberts discloses that there are shortcomings in the prior art wire bonding systems in that they utilize lead frames that provide an insufficient indication of the orientation of the lead frame (col. 3 lines 10-12). One way of remedying this problem is to use at least one distinctive figure 54 otherwise referred to as an eyepoint feature that enables the wire bonding system to from wire bonds with greater reliability (col. 5 lines 64-65).

Moon, Ito, and Roberts are analogous art because they are from the same field of endeavor of using a wire bonding process to mount a die onto a lead frame.

At the time of the invention it would have been obvious to use the process of comparing the image taken by Moon to a reference image in order to confirm the alignment condition of the die and lead frame, and to set the eyebox on a

pattern adjacent to the edge of the die and outside of the bond pads. The motivation for using the method as disclosed by Ito is that good results for the correction can be obtained. The motivation for using the method of Roberts is that it increases the reliability of the system. Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention to combine Moon, Ito, and Roberts in order to obtain the invention as specified in claim 28.

Regarding claim 29, it would be obvious that if the chip is properly aligned that the first picture would be identical to the control picture.

Regarding claim 31, as stated above by Moon the pattern is a picture.

Regarding claim 32, as stated by Moon the combination as discussed would be used to "confirm the alignment condition of the die and frame" (105 fig. 7).

5. Claims 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Moon USPN 5,796,161 in view of Ito USPN 5,406,700 further in view of Roberts et al. USPN 6,577,019 (hereinafter "Roberts") and further in view of the Applicant's admitted prior art.

Regarding claim 30, Moon does not disclose moving the camera to make the picture identical with the control picture.

On page 6 lines 18-35 of the applicant admitted prior art the process of moving a camera to make an image equivalent to a control image if the image is within a specified range is disclosed.

Moon, Ito, Roberts, and the Applicant's admitted prior art are analogous because they are all from the same field of endeavor of wire bonding processes of a lead frame.

At the time of the invention it would have been obvious to one of ordinary skill in the art to combine Moon, Ito, and Roberts in the manner stated above, and further combine them with the Applicant's admitted prior art in order to obtain an invention that accounts for camera misalignment by aligning the camera to the window. The motivation for doing so would be to allow for slight problems that result from camera alignment and do not relate to the position of the substrate to be resolved before moving the substrate. Therefore it would have been obvious at the time of the invention to one of ordinary skill in the art to combine Moon, Ito, Roberts and the Applicant's admitted prior art in order to obtain the invention specified in claim 30.

6. Claim 23 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ito USPN 5,406,700 in view of JP02-285664, Manufacture of a lead frame device Tsuji et al. (hereinafter "Tsuji").

Ito discloses a method of producing an integrated circuit lead frame and a method of mounting a chip onto the lead frame (col. 1 lines 13-17). Ito further discloses a pair of inner leads 3 and 3m (figure 1) that are made to have Z-shaped step portions (unsymmetrical part of the substrate). As seen in Fig. 2 labeled 20a a lead eye box is set on an unsymmetrical portion, and a corner point is found 21a (lead eye point). The window is "recognized as an image" (col.

4 lines 43-45). This image is "compared with a reference image and reference position information stored in an image recognition apparatus" (col. 4 lines 45-47). Ito does not explicitly disclose that the lead eye box is set on dent parts.

Tsuji discloses a process for manufacturing a lead frame that allows for high precision. Within the lead frame semispherical dents 1e are provided near the bonding regions at the ends of the leads, and a camera is used to detect the dents (as disclosed in the translated constitution section).

Ito and Tsuji are analogous art because they are from the same field of endeavor of lead frame manufacture.

At the time of the invention it would have been obvious to one of ordinary skill in the art to combine Ito and Tsuji to set a lead box on a dent part. Ito discloses setting a lead box on an unsymmetrical part of the lead, and Tsuji discloses one possible place to set the image is the dent parts. Thus it would have been obvious to one of ordinary skill in the art to combine Ito and Tsuji to obtain the invention as specified in claim 23.

7. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ito USPN 5,406,700 in view of JP-05315496, Manufacture of lead frame, Fujita.

Ito discloses a method of producing an integrated circuit lead frame and a method of mounting a chip onto the lead frame (col. 1 lines 13-17). Ito further discloses a pair of inner leads 3 and 3m (figure 1) that are made to have Z-shaped step portions (unsymmetrical part of the substrate). As seen in Fig. 2 labeled 20a a lead eye box is set on an unsymmetrical portion, and a corner

point is found 21a (lead eye point). The window is "recognized as an image" (col. 4 lines 43-45). This image is "compared with a reference image and reference position information stored in an image recognition apparatus" (col. 4 lines 45-47). Ito does not explicitly disclose that the lead eye box is set on a plated layer.

Fujita discloses a process for manufacturing a lead frame that decides immediately if a plating position is proper or not. A plated layer 12 is formed on a die pad 2 and on the point parts of inner leads 4. Then an image of the plated layer is received and processed to decide if the plating position is proper (as disclosed in the translated constitution section)..

Ito and Fujita are analogous art because they are from the same field of endeavor of lead frame manufacture.

At the time of the invention it would have been obvious to one of ordinary skill in the art to combine Ito and Fujita to set a lead box on a plated layer. Ito discloses setting a lead box on an unsymmetrical part of the lead, and Fujita discloses one possible place to set the image is the plated layer. Thus it would have been obvious to one of ordinary skill in the art to combine Ito and Fujita to obtain the invention as specified in claim 24.

Allowable Subject Matter

8. Claims 1-6, and 8-17 are allowed.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John B Strege whose telephone number is

(703) 305-8679. The examiner can normally be reached on Monday-Friday between the hours of 8-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on (703) 308-5246. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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